Structural Post-construction Storm Water Best Management Practice Selection Tool

Step 1: Eliminate infeasible Best Management Practices (BMPs) for a specific site by applying the site information and requirements to the 'Hard Gates.'

HARD GATES	Volume		Cold Water		Soil Type		Depth to Groundwater			Drainage Area Size (acres)				Site Slope (%)					
Best Management Practice	yes	no	yes	no	infiltration rate less than 0.5 in/hr	infiltration rate more than 0.5 in/hr	bottom of BMP intersects groundwater table	4 to 9 ft. separation	sufficient separation to make sure the BMP never intersects the groundwater table	less than 5	5 to 10	10 to 25	25 or more	0	1 to 3	4 to 5	6	7 to 15	16+
Infiltration Basin	yes		yes	no		yes		yes	yes	yes	yes			yes	yes	yes	yes	yes	
Grassed Channel	yes		yes	no		yes		yes	yes	yes				yes	yes				
Infiltration Trench	yes		yes	no		yes		yes	yes	yes				yes	yes	yes	yes	yes	
Porous Pavement	yes		yes	no		yes		yes	yes	yes	yes	yes	yes	yes	yes				
Vegetated Filter Strip	yes		yes	no		yes		yes	yes	yes					yes	yes	yes		
On-Lot Treatment	yes		yes	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Dry Swale	yes		yes	no	yes	yes		yes	yes	yes				yes	yes				
Bioretention	yes		yes	no	yes	yes			yes	yes				yes	yes	yes			
Dry Detention Ponds	yes			no	yes	yes			yes			yes	yes	yes	yes	yes	yes	yes	
Wet Swale		no	yes	no		yes	yes			yes				yes	yes				
Sand and Organic Filters		no	yes	no	yes	yes		yes	yes	yes	yes			yes	yes	yes	yes		
Alum Injection		no	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Catch Basin Inserts		no	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Manufactured Products		no	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
In-Line Storage		no	yes	no	yes	yes	yes	yes	yes	yes	yes	yes			yes				
Wet Ponds		no		no	yes	yes	yes	yes	yes				yes	yes	yes	yes	yes	yes	
Storm Water Wetlands		no		no	yes	yes	yes	yes	yes				yes	yes	yes	yes	yes	yes	

Step 2: Evaluate the remaining BMP options using the 'Soft Gate' criteria after considering the land uses of this site and the pollutants of concern that will need to be treated.

SOFT GATES	Pollutant Load Reduction (% Removal)						Cost			Environmental Impacts	Social Acceptance
Best Management Practices	Total Suspended Solids	Total Phosphorus	Total Nitrogen	Nitrate as Nitrogen	Metals	Bacteria	Construction	Annual Maintenance	Additional Costs/Value		
On-Lot Treatment	N/A	N/A	N/A	N/A	N/A	N/A	$100 to $200	N/A	1,3,4,7,10,11,12	5	
Bioretention	90	70-83	49	15-16	43-98	90	$3 to $4 residential, $10 to $40 commercial/sq ft	typical landscaping costs	1,2,3,4,5,7,9,11,15	6	1,5,6,7,13
Porous Pavement	82-95	65	80-85		98-99		$10,105 for a one acre watershed	$3,960 for 1 acre watershed	1,7,16,20,22	1	4
Alum Injection	95-99	37-95	52-70		41-90	99	$135,000 to $400,000	$6,500 to $25,000	18,25	13,14,15,16	
Dry Swale	77-99	8-99	67-99	45-99	37-99	-33	$0.50 per sq ft	$0.58 to $0.75 per linear ft	1,4,7,9,15	1,2	1,3,13
Infiltration Trench	75				85-90	90	$5/cubic ft treated	5 - 20 % of the const. cost	4,5,6,20	1,2,4,11	3
Infiltration Basin	75				85-90	90	$2/cubic ft of storage	5 -10% of the const. cost	5,6,20	1,2,3,4,11	3
Storm Water Wetlands	83	43	26	73	36	76	$57,100 for a one acre ft facility	3 to 5% of const. cost	2,13,14,19	2,6,12	1,2,3,8,11,12,13
Sand and Organic Filters	65-89	40-85	17-47	-76	25-90	55-65	$5/cubic ft treated	$2,000 to $4,000 every 2 -10 years	10,16	10	
Wet Swale	67-81	17-39	40	9-52	-35 - 69		$0.50 per sq ft	$0.58 to $0.75 per linear ft	1,2,3,4,7,9	2	1,3,13
Grassed Channel	67-83	4-29		-25-31	2-73	-100 - -25	$0.50 per sq ft	$0.58 to $0.75 per linear ft	1,2,4,7,9,15,20	1,2	1,3,13
Vegetated Filter Strip	54-84	-25-40	15	-27-20	-16-88		$0.30 to $0.70/sq ft	$350/acre/year	2,4,9,15	1	1,4
Catch Basin Inserts	32-97				3-15		$2,000 - $3,000 per inlet	$125,000 to 150,000 for a vactor truck	16,17,18,23,24	7,8,9	
Wet Ponds	32-99	12-91	-12-85	-85-97	-51-90	46-91	$45,700 for a one acre-ft facility	3 to 5 % of const. costs	2,3,8,13,14,19	2,5,6	1,3,8,9,12,13
Dry Detention Ponds	61	19	31	9	26-54		$41,600 for a one acre-ft pond	3 to 5% of const. cost	5,6,14,15,19,21	1,2	3,9,14
Manufactured Products	21-51	17			17-51		$5,000 to $35,000 or $5,000 to $10,000 per impervious acre	$125,000 to 150,000 for a vactor truck	16,17,18,23,24,25	8,9	13
In-Line Storage	0	0	0	0	0	0	low	low	12,16		10

key:	
	84 - 100%
	67 - 83%
	50 - 66%
	33 - 49%
	16 - 32%
	0 - 15%

	Data not available
N/A	Not Applicable

Cost				
$0 - $50,000	$0 - $10,000	favourable	favourable	favourable
$50,000 - $100,000	$10,000 - $20,000			
$100,000 - $150,000	$20,000 - $30,000			
$150,000 - $200,000	$30,000 - $40,000			
$200,000 - $250,000	$40,000 - $50,000			
$250,000 - $300,000	$50,000 - $60,000	least favourable	least favourable	least favourable

Additional Costs/Value:
1: Less expensive than, or reduces the cost of, a traditional design concrete sewer system
2: Aesthetic value
3: Captured water may be used for irrigation reducing water use and utility costs
4: Can fit into small otherwise unusable portions of a site
5: Recharges groundwater
6: Maintains flows in streams
7: May reduce the need for land intensive BMPs
8: Recreational value
9: Replaces an area that would have been landscaped
10: More flexibility in design sizing compared to other manufactured BMPs
11: Maintained by homeowner/reduces public maintenance costs
12: Requires little maintenance
13: May increase property values by 10 to 25%
14: Long life time (more than 20 years)
15: Maintenance overlaps with landscaping maintenance
16: Consumes no surface space
17: Truck maintenance and fuel
18: Staff costs to operate the BMP equipment
19: Requires a large land area
20: Particularly susceptible to failure if not maintained
21: Can detract from the value of adjacent homes by 3 to 10%
22: Requires a vacuum sweeper for maintenance
23: Requires a vactor truck for maintenance
24: Material disposal costs
25: Requires frequent maintenance

Environmental Impacts:
1: Provides groundwater recharge
2: Provides channel protection
3: Maintains flows in streams
4: 100% load reduction to surface waters
5: Conserves water, may be used for irrigation
6: Provides habitat
7: Provides spill control
8: Can become a source of pollutants through resuspension
9: Concentration of pollutants in sediments may have to be disposed of as hazardous waste
10: Sorbent pillows may have to be disposed of as hazardous waste
11: Potential for groundwater contamination
12: May release nutrients during the non-growing season
13: Settled floc contains high concentrations of dissolved chemicals, bacteria and viruses and must be disposed of properly
14: Requires electricity to operate pumps that dispose of floc to sludge drying beds or sanitary sewer (with permit).
15: Experimental practice, little is known about long term impacts.
16: Chemicals added during the process may have negative impacts on down stream waters.

Social Acceptance:
1: Provides aesthetic value
2: Educational value
3: Provides flood control
4: Unobtrusive, high level of acceptance by the public
5: Provides noise reduction
6: Provides shade
7: Provides wind breaks
8: May increase the value of nearby homes
9: Recreational value
10: May cause up stream flooding
11: Can look swampy
12: Safety concerns where there is public access
13: May allow mosquito breeding
14: May devalue nearby homes

Step 3: To narrow the remaining BMP options consider:

Design considerations:
- Climate of the project location
- Incorporates input of those affected

Construction considerations:
- Materials are locally sourced
- Transport distance is minimised (materials and labour)
- Renewable resources utilised in place of non-renewable resources

Operation considerations:
- Flooding impact on downstream communities eliminated

Disposal considerations:
- Materials used are recyclable or reusable
- Maintenance wastes are recyclable or compostable

The material and energy use during the construction, operation, and disposal of the BMP should be minimised.

If the use of one BMP will not meet the needs of a unique or diverse site, two or more BMPs can be used in parallel or in series to accomplish volume reduction or treatment goals. Large sites may be divided into multiple small drainage areas to utilise BMPs that best serve smaller areas.

(Sources: USEPA, 2006; CASQA, 2003; SMRC, 2006) Data last verified August 2006.